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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/757,392	01/15/2004	You-scop Lee	249/438	4957

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EXAMINER	
WEINSTEIN, LEONARD J	
ART UNIT	**PAPER NUMBER**
3746	

MAIL DATE	DELIVERY MODE
12/07/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/757,392	LEE ET AL.	
	Examiner	Art Unit	
	Leonard J. Weinstein	3746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 October 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. The request for a continued prosecution application (CPA) under 37 CFR 1.53(d) filed on [1] is acknowledged. 37 CFR 1.53(d)(1) was amended to provide that the CPA must be for a design patent and the prior application of the CPA must be a design application that is complete as defined by 37 CFR 1.51(b). See *Elimination of Continued Prosecution Application Practice as to Utility and Plant Patent* Applications, final rule, 68 *Fed. Reg.* 32376 (May 30, 2003), 1271 *Off. Gaz. Pat. Office* 143 (June 24, 2003). Since a CPA of this application is not permitted under 37 CFR 1.53(d)(1), the improper request for a CPA is being treated as a request for continued examination of this application under 37 CFR 1.114.

2. This office action is in response to the amendment of October 17, 2007. In making the below rejections and/or objections the examiner has considered and addressed each of the applicant's arguments.

3. The examiner acknowledges the amendment to claim 1 and the addition of claim 22 in the amendment of October 17, 2007.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1, 4, 6-9, 18, and 20 are rejected under 35 U.S.C. 102(e) as being anticipated by Ma US 2003/0086790. With respect to claims 1, 4, and 6-8, 18 and 20 Ma teaches (as does the applicant with figures 3A and 3B and the disclosure in ¶0009 of the instant application) that the following limitations were known within the art the time the invention was made including: (claim 1) a pumping chamber 1 to be filled with a fluid, at least one fluid entrance 2 and at least one fluid exit 3, each one of the fluid entrance 2 and fluid exit 3 being connected directly between the pumping chamber 1 and a respective manifold, as shown in figures 1A-1B, a heating element (not shown but disclosed in ¶0009) at one side of the pumping chamber 1 to generate bubbles in the pumping chamber 1 by heating the fluid, and electrodes (not shown but disclosed by Ma as a known way for activating a heating element in ¶0040) for applying current to the heating element (not shown but disclosed in ¶0009), wherein a fluid flow into or out of the pumping chamber 1 is by expansion and contraction of the bubbles, and wherein a cross-sectional area of at least one of the fluid entrance 2 and the fluid exit 3 varies along a direction, clearly shown in figures 1A and 1B, of the fluid flow to have a constant inclination angle along its entire length (¶0009); (claim 4) a cross-sectional area of the fluid entrance increases in a direction toward the pumping chamber, and the cross- sectional area of the fluid exit decreases in a direction toward the pumping chamber; (claim 6) a fluid entrance 2 is provided at one side of the pumping chamber 1 and the fluid exit 3 is provided at an opposite

side of the pumping chamber 1 to face the fluid entrance 2 (figs. 1A and 1B); (claim 7) a fluid entrance 2 and the fluid exit 3 has a pyramid shape (figs. 1A and 1B); (claim 8) a fluid entrance 2 and the fluid exit 3 has a uniform height and a width varying in the direction of the fluid flow, clearly shown in figures 1A and 1B; (claim 9) a pumping chamber 1 and the heating element (not shown but disclosed in ¶0009) has a rectangular shape, as shown in figures 1A and 1B; (claim 18) a fluid entrance 2 and/or a fluid exit 3 includes a surface slanted at an angle with respect to a bottom surface of the pumping chamber 1, as shown in figures 1A and 1B; (claim 20) a central axis along a length of each one of the fluid entrance 2 and fluid exit 3 is parallel to a bottom surface of the pumping chamber 1, as can be seen in figures 1A and 1B.

7. Claim1-2, 6-7, 11-12, and 17-18 are rejected under 35 U.S.C. 102(b) as being anticipated by Peeters et al. 5,751,317. Peeters teaches all the limitations as claimed for a micro-pump including: (claim 1) a pumping chamber, as defined by the space surrounding element 20, to be filled with a fluid, at least one fluid entrance and at least one fluid exit, each one of the fluid entrance and fluid exit being connected directly between the pumping chamber, as defined by the space surrounding element 20, and a respective manifold 12, a heating element 20 at one side of the pumping chamber, as defined by the space surrounding element 20, to generate bubbles in the pumping chamber, as defined by the space surrounding element 20, by heating the fluid and electrodes (not shown – col. 3 ll. 39-45) for applying current to the heating element 20, wherein a fluid flow into or out of the pumping chamber, as defined by the space surrounding element 20, is by expansion and contraction of the bubbles (col. 3 ll. 45-49), and wherein a cross-sectional area of at least one of the fluid entrance 16 and the fluid exit 18 varies along a direction of the fluid flow to have a constant inclination angle along its entire length, as clearly shown in figure1; (claim 2) a cross-sectional area of the fluid entrance 16

decreases, via element 42, in a direction toward the pumping chamber, as defined by the space surrounding element 20, and the cross- sectional area of the fluid exit 18 increases, via element 46, in a direction toward the pumping chamber, as defined by the space surrounding element 20; (claim 6) a fluid entrance 16 is provided at one side of the pumping chamber, as defined by the space surrounding element 20, and the fluid exit 18 is provided at an opposite side of the pumping chamber, as defined by the space surrounding element 20, to face the fluid entrance 16, as shown in figure 1; (claim 7) a fluid entrance 16 and the fluid exit 18 has a pyramid shape, as can be seen with elements 42 and 46 respectively in figure 1; (claim 11) a heating element 20 is formed of a resistive heating material (col. 3 ll. 35-39); (claim 12) a substrate (col. 5 ll. 62-66) surrounding portions of the pumping chamber, as defined by the space surrounding element 20, the fluid entrance 16, and the fluid exit 18; (claim 17) a heating element 20 is outside the pumping chamber, as defined by the space surrounding element 20, as element 20 is disclosed to be separated from a chamber by several protective layers (col. 3 ll. 39-35-39); (claim 18) and a fluid entrance 2 and/or a fluid exit 3 includes a surface slanted at an angle with respect to a bottom surface of the pumping chamber, as defined by the space surrounding element 20, as shown in figures 1.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

10. Claim 3 rejected under 35 U.S.C. 103(a) as being unpatentable over Peeters et al. 5,751,317. Peeters discloses the general conditions of the claimed invention except for the express disclosure of a fluid entrance and the fluid exit formed to have an inclination angle of about 50° to about 70°. It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a fluid entrance and a fluid exit for a micro-pump, formed to have an inclination angle of about 50° to about 70°, since the claimed values are merely an optimum or workable range. It has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

11. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ma US 2003/0086790. Ma discloses the general conditions of the claimed invention except for the express disclosure of a fluid entrance and the fluid exit formed to have an inclination angle of about 30° or less. It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a fluid entrance and a fluid exit for a micro-pump, formed to have an inclination angle of about 30° or less, since the claimed values are merely an optimum or workable range. It has been held that where the general conditions of a claim are disclosed

in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

12. Claims 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Peeters et al. 5,751,317. Peeters discloses the general conditions of the claimed invention including (claim 9 in part) a rectangular shaped pumping chamber, with the portion of the space around 20 that extends between the edges of elements 40 and 46 bordered and an upper and lower boundary with a flat horizontal orientated surface. Peeters fails to teach the express disclosure of (claim 9) a heating element having rectangular shape; (claim 10) and a pumping chamber and a heating element having a circular shape. These modifications are determined to be a change in the shape of the elements claimed. A change in form or shape is generally recognized as being within the level of ordinary skill in the art, absent any showing of unexpected results. In re Dailey et al., 149 USPQ 47. A Change in aesthetic (ornamental) design generally will not support patentability. In re Seid, 73 USPQ 431.

13. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ma US 2003/0086790. Ma discloses the general conditions of the claimed invention except for the express disclosure of a pumping chamber and a heating element having a circular shape. This is determined to be a change in the shape of the elements claimed. A change in form or shape is generally recognized as being within the level of ordinary skill in the art, absent any showing of unexpected results. In re Dailey et al., 149 USPQ 47. A Change in aesthetic (ornamental) design generally will not support patentability. In re Seid, 73 USPQ 431.

14. Claims 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Peeters in view of Field et al. 6,062,681. Peters teaches all the limitations as discussed including (claim 14) a passivation layer (col. 3 ll. 35-39) on a heating element 20 and electrodes (not shown but

disclosed in col. 3 ll. 39-45), and further that there are several protective layers. Peeters fails to teach the following limitations for a micro-pump that are taught by Field: (claim 13) an insulation layer 51 between a substrate 45 and a heating element, elements 34 and 35, the insulation layer 51 being in communication with a fluid in a pumping chamber 16; (claim 14) a passivation layer 43 on a heating element, elements 34 and 35, and a instances of electrodes 64; (claim 15) a heat dissipation layer 42 formed on a passivation layer 43 for dissipating heat, wherein the heat dissipation layer 42 is connected to a substrate 45, via element 43. It would have been obvious to one of ordinary skill in the art at the time of the invention to provide an insulation and heat dissipation layer on a pumping chamber of micro-pump in order to protect a heating element and provide thermal and electrical insulation to a pump chamber (Field – col. 12 ll. 50-57).

15. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Peeters et al. 5,751,317 and Field 6,062,681 as applied to claim 15 above. A combination of Peeters and Field teaches the claimed invention except for a heat dissipation layer made from metal. It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a dissipation layer made of metal in order to effectively remove heat from a micro-pump system. It has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

16. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Peeters et al. 5,751,317 and Field 6,062,681 as applied to claim 13 above. A combination of Peeters and Field teaches the claimed invention except for providing an insulation layer on an upper wall of a pump. It would have been obvious to one having ordinary skill in the art at the time the

invention was made to insulation layer on an upper wall of a pump in order to provide a thermal and electrical insulation between a heater and substrate (Field - col. 12 ll. 55-57). It has been held that rearranging parts of an invention involves only routine skill in the art. In re Japikse, 86 USPQ 70.

Response to Arguments

17. Applicant's arguments with respect to claims 1-19 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

18. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure are cited on form 892 herewith.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leonard J. Weinstein whose telephone number is (571) 272-9961. The examiner can normally be reached on Monday - Thursday 7:00 - 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Devon Karmer can be reached on (571) 272-7118. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LJW

12/5/07